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H20 Temperature

**Air – H20 Temperature Concerns**

***Q. I am trying to find a safe and comfortable air temperature for my indoor pool – can you provide information to assist?***

A. There are so many variables concerning the air temperature and humidity levels in an indoor pool, that AEA does not list a specific recommendation.

The following information is backed by experience, antidotal evidence and research data from Desert Aire (the largest HVAC manufacturers for pool room heat and dehumidification).    
   
Decades ago, when most pools were 4-lane, 20-yard tanks in the basement of brick buildings, someone came up with the observation that the air was easier to breath when the water and air temperature were within a couple of degrees of each other.  From these commonsense observation parameters were developed.  This was when boilers heated most indoor pools and the water temp was always around 84 degrees.  The air handling systems were usually steam (hot water) and there was really no such thing as dehumidification.  Bringing steam heat (no forced air) into a room with the thermostat set at 74 degrees F (23 C) was no problem. There was no draft and by the time the air contacted the warmer water, the room temp leveled out about 78 degrees F (25.5 C).  
   
Now we are in the age of forced-air gas or electric heat and steel buildings rather than brick and mortar.  The steel is susceptible to corrosion caused by moisture and the air must be dehumidified.  It’s a new ball game but some are still trying to play by the old rules.  We would like to give you a formula, but the systems vary too much as does the air duct configuration.  Even warmer air blowing across the client’s wet body can be uncomfortable.  We have come full circle to using common sense supported by pages of formulas and calculations.   
   
Definitively, here is where we are:

1. Room size – the larger the room the harder it is to find a comfortable air-water temperature balance.
2. Pool size (surface area) - the more surface area the more the water will heat the air and add humidity.
3. Pool agitation and bather load – the more jets and bubblers and the more people splashing, the more interaction between air and water.
4. Chemical treatment of the water – the type and brand of chemicals greatly affects air and water quality. We have very solid opinions as to what type of disinfection system is best but will not cover that subject in this article.
5. Type and size of filter – the more efficient the water filtration the better the air quality.
6. Type and brand of Heating Ventilating Air Conditioning (HVAC) system and dehumidification system.
7. Pool patrons – the age, abilities of clients as well as the type of programming will influence how the temperature is perceived and accepted (e.g. high intensity exercise & therapy/rehab; children or seniors & active young adults, etc.)

These variables are why there is no “set formula” to calculate air temperature for an indoor pool.  
   
Some other related situations:

Almost every pool room is designed to have a negative pressure.  That means there is more air being exhausted than is being brought in.  If there is a steam room or sauna adjacent to the pool room, every time someone opens the door of the steam room or sauna – hot moist air immediately is being drawn into the pool room.   This is where the perception of “heavy air” is coming from.  It is humid and warm.

Other than people with acute respiratory problems, fresh humid air should not be harmful. The problem comes from the pool evaporation if the water is not balanced properly.  When that happens, Chloramines are released in the air resulting in potential health risks, such as Lifeguard (or Coaches) Lung. This problem is common across the country and has a few solutions, one being an Ultraviolet pool water treatment system.  There is an easy water test to check for this, it is the “free and available chlorine comparison”.

Bottom line – you are correct in being concerned about water and air quality and temperature. If your water is 83-86 F (28-30 C) – keep the air at 78-80 F (25.5 – 26 C) and drafts off clients in the pool. Have the HVAC filters checked every 3 months and check water chemistry twice a day.

**Water Temperature –**

Water varying from 83-86 degrees Fahrenheit (28-30 degrees Celsius) is the most comfortable temperature for typical water fitness classes and general aquatic programming. This allows the body to react and respond normally to the onset of exercise and the accompanying increase in body temperature.  Cooling benefits are still felt and there is little risk of overheating. Program modifications will be required for water temperature outside the recommended range. Aquatic Fitness Professionals should know the water temperature and modify the program accordingly based upon the population and the program format.  
   
Water temperature below the recommended range requires modifications in programming. The primary focus of the warmup should be large, lower impact, rhythmic movements that gradually elevate core temperature of the body and should last for at least 9-15 minutes. The main segment must be of adequate intensity to maintain proper body temperature and prevent injury. Participants may find it necessary to wear specialized clothing to maintain body heat.  The cool down and post-stretch must be adjusted, in overall length as well as activity, according to the environmental conditions. Water temperature above the recommended range also requires modifications in programming.  The intensity and length of the main segment should be adjusted to prevent overheating.  Encourage proper hydration and apparel (e.g. avoid swimming caps that prevent heat dissipation).  An extended cool down with emphasis on stretching and relaxation is appropriate.  
   
Specialized populations may require specific water temperatures for safe and effective programming.  Some general guidelines are as follows:

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| Swim Team & Lap Swim | 78 – 82 F = 25.5 – 27.5 C | Slightly warmer may be workable |
| Resistance Training | 83 – 86 F = 28 – 30 C |  |
| Therapy & Rehab | 91 – 95 F  = 33 – 35 C | Can be as low as 87 F for many types of therapy |
| Multiple Sclerosis | 80 – 84 F  = 26.5 – 29 C | Warmer water can cause adverse affects |
| Pregnancy | 78 – 84F   = 25.5 – 29 C | Warmer water can cause adverse affects |
| Arthritis | 84 – 88 F = 29 – 31 C  86 – 90 F = 28 – 32 C | Arthritis Foundation minimum  ATRI low function program |
| Fibromyalgia | 86 – 96 F   = 30 – 35.5 C | ATRI |
| Aerobic activity | 84 – 88 F   = 29 – 31 C | Arthritis Foundation |
| Older adults - vertical | 83 – 86 F    = 28 – 30 C  86 – 88 F   =   30 – 31 C | Moderate to high intensity  Low intensity |
| Children, fitness | 83 – 86 F    = 28 – 30 C |  |
| Children’s swim lessons | 82+ F       = 27.5+ C | Varies with age and class length |
| Obese | 80 – 86 F    =    26.5 – 30 C |  |

**Water Depth**

             
Shallow water programs are typically performed in water that ranges from mid-rib cage to mid-chest in depth.  This provides the benefits of reduced impact while still maintaining proper alignment and control of movement and allows for activities that sufficiently train all the major muscle groups against the water’s resistance.  Specific programming options may require variations in water depth.  Water that is below waist-depth will require that impact levels be modified to prevent musculoskeletal injury; this water depth will also reduce the water’s cooling ability during sustained exercise so intensity should be carefully monitored.    
   
Pools with a depth range of 3.5 - 4.5 feet (1.07 - 1.37 meters) seem to be the most useful for typical shallow water fitness classes; pools with a depth of 3-5 feet (0.91 - 1.52 meters) will accommodate nearly all heights of participants.  A gradual slope of the pool bottom is preferred to accommodate varying heights of participants.  A steep slope may lead to musculoskeletal stress. 4’ deep is the most versatile programmable depth.   
 

Deep water exercise is most successful at a depth where a body can be suspended vertically and is free to move in any direction and speed, without experiencing impact or weight bearing stress. A pool depth of 6.7 feet (2 meters) or more provides the ideal environment for a deep-water class. In some situations, either due to the pool slope / depth or the height of the participant, it is necessary to perform a modified deep-water workout.   
   
A modified deep format would incorporate flotation equipment, but movement adaptation would be necessary as compared to typical deep-water training.  For example, full range of motion cross country skis would be modified to prevent striking the feet on the bottom of the pool.    
   
**Pool Entry & Exit**

Many pools have ramps, walk-in access, chair lifts or shallow water areas where participants can enter and exit the water.  However, some pools still require the use of steps and ladders and this may restrict the participants that you can accommodate. Some individuals may require assistance whereas others may not be able to enter/exit the pool via a ladder. All steps and ladders should be secure, slip resistant, and have safety handrails. When designing NEW pool facilities, it is imperative to consider safe entry and exit options for all abilities.  
   
**Air Quality**

Air quality for indoor pool facilities should be monitored according to the Country, State and Local Health Department Guidelines.  Adequate ventilation is critical to maintain proper humidity and remove chemical fumes from the pool area.  Humidity level and air circulation will also influence the comfort level of the participant and thus requires constant monitoring. Always remember: Air quality is totally dependent on Water quality.